



NUCLEAR REGULATORY COMMISSION

[NRC-2021-0112]

Fuel Qualification for Advanced Reactors

AGENCY: Nuclear Regulatory Commission.

ACTION: NUREG; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing NUREG-2246, “Fuel Qualification for Advanced Reactors.” The purpose of this NUREG report is to provide a fuel qualification assessment framework for use by applicants for proposed advanced reactors using fuel designs and operating environments that differ from traditional light water reactor fuel. Specifically, the framework provides objective criteria, derived from regulatory requirements, that when satisfied, would support regulatory findings for licensing.

DATES: NUREG-2246, Revision 0 is available on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID **NRC-2021-0112** when contacting the NRC about the availability of information regarding this document. You may obtain publicly available information related to this document using any of the following methods:

- **Federal Rulemaking Website:** Go to <https://www.regulations.gov> and search for Docket ID **NRC-2021-0112**. Address questions about Docket IDs in Regulations.gov to Stacy Schumann; telephone: 301-415-0624; email: Stacy.Schumann@nrc.gov. For technical questions, contact the individuals listed in the “For Further Information Contact” section of this document.

- **NRC’s Agencywide Documents Access and Management System**

(ADAMS): You may obtain publicly available documents online in the ADAMS Public Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209,

301-415-4737, or by email to PDR.Resource@nrc.gov. NUREG-2246, "Fuel Qualification for Advanced Reactors," is available in ADAMS under Accession No. ML22063A131.

- **NRC's PDR:** You may examine and purchase copies of public documents, by appointment, at the NRC's PDR, Room P1 B35, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8:00 a.m. and 4:00 p.m. (ET), Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Timothy Drzewiecki, telephone: 301-415-5184, email: Timothy.Drzewiecki@nrc.gov and Jordan Hoellman, telephone: 301-415-5481, email: Jordan.Hoellman2@nrc.gov. Both are staff of the Office of Nuclear Reactor Regulation at the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

I. Discussion

Proposed advanced reactor technologies use fuel designs and operating environments (e.g., neutron energy spectra, fuel temperatures, neighboring materials) that differ from those described in previous NRC guidance and frameworks applicable to traditional light-water reactor fuel. As such, the purpose of this report is to identify criteria that will be useful for advanced reactor fuel designs through an assessment framework that would support regulatory findings associated with nuclear fuel qualification. The report begins by examining the regulatory basis and related guidance applicable to fuel qualification, noting that the role of nuclear fuel in the protection against the release of radioactivity for a nuclear facility depends heavily on the reactor design. The report considers the use of accelerated fuel qualification techniques and lead test specimen programs that may shorten the timeline for qualifying fuel for use in a nuclear reactor at the desired parameters (e.g., burnup). The assessment framework

particularly emphasizes the identification of key fuel manufacturing parameters, the specification of a fuel performance envelope to inform testing requirements, the use of evaluation models in the fuel qualification process, and the assessment of the experimental data used to develop and validate evaluation models and empirical safety criteria.

II. Additional Information

Draft NUREG-2246, Revision 0, was published in the *Federal Register* for public comment on June 30, 2021 (86 FR 34794) with a 60-day comment period. The NRC received three public comments from private citizens and industry organizations. The NRC staff's evaluation and resolution of the public comments are documented in Appendix B to NUREG-2246 in ADAMS under Accession No. ML22063A131.

III. Congressional Review Act

NUREG-2246, Revision 0, is a rule as defined in the Congressional Review Act (5 U.S.C. 801-808). However, the Office of Management and Budget has not found it to be a major rule as defined in the Congressional Review Act.

Dated: March 9, 2022.

For the Nuclear Regulatory Commission.

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